



TEST REPORT

Test report no.: 1-6080/13-01-08-A



Testing laboratory

CETECOM ICT Services GmbH
 Untertuerkheimer Strasse 6 – 10
 66117 Saarbruecken / Germany
 Phone: + 49 681 5 98 - 0
 Fax: + 49 681 5 98 - 9075
 Internet: <http://www.cetecom.com>
 e-mail: ict@cetecom.com

Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
 Area of Testing: Radio/Satellite Communications

Applicant

FLIR Systems AB
 Antennvägen 6
 18715 Täby / SWEDEN
 Contact: Göran Skedung
 e-mail: goran.skedung@flir.se
 Phone: +46 87 53 27 59

Manufacturer

FLIR Systems AB
 Antennvägen 6
 18715 Täby / SWEDEN

Test standard/s

47 CFR Part 15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	Infrared Camera
Model name:	FLIR-E64501 (Exx)
FCC ID:	ZLV-FLIRE49001
IC:	5306A-FLIRE49001
Frequency:	ISM band 2.4 GHz lowest channel 00 – 2402 MHz; highest channel 78 – 2480 MHz
Technology tested:	Bluetooth®, +EDR
Antenna:	Integrated antenna
Power Supply:	3.7V DC by Li-Ion battery pack
Temperature Range:	-/-°C to -/-°C



This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorised:

Stefan Bös
 Senior Testing Manager

Test performed:

Andreas Luckenbill
 Expert

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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2013-05-30
Date of receipt of test item:	2013-06-11
Start of test:	2013-06-11
End of test:	2013-06-14
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 15	01.10.2012	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices
RSS - 210 Issue 8	01.12.2010	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	-/- °C during high temperature tests
	T_{min}	-/- °C during low temperature tests
Relative humidity content:		55 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li-Ion battery pack
	V_{max}	-/- V
	V_{min}	-/- V

5 Test item

Kind of test item	:	Infrared Camera
Type identification	:	FLIR-E64501 (Exx)
S/N serial number	:	Rad. 49038203, 49038150
HW hardware status	:	ERCO board -01
SW software status	:	rev. 0.31G.2T
Frequency band [MHz]	:	ISM band 2.4 GHz lowest channel 00 – 2402 MHz; highest channel 78 – 2480 MHz
Type of radio transmission	:	FHSS
Use of frequency spectrum	:	
Type of modulation	:	GFSK, Pi/4 DQPSK, 8DPSK
Number of channels	:	79
Antenna	:	Integrated antenna
Power supply	:	3.7 V DC by Li-Ion battery pack
Temperature range	:	-/-°C to -/-°C

5.1 Additional information

Test setup- and EUT-photos are included in test reports:

External photos of the EUT:	1-6080/13-01-01_AnnexA
Internal photos of the EUT:	1-6080/13-01-01_AnnexB
Testsetup photos:	1-6080/13-01-01_AnnexD

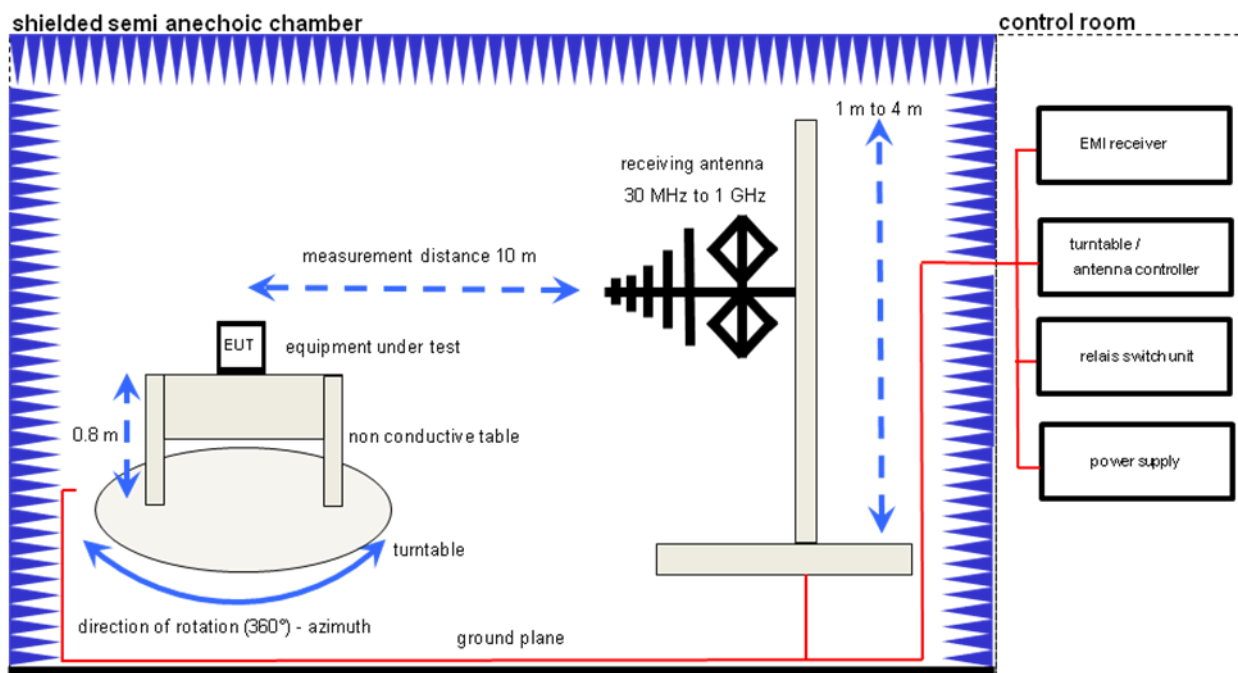
6 Test laboratories sub-contracted

None

7 Description of the test setup

7.1 Radiated measurements chamber F

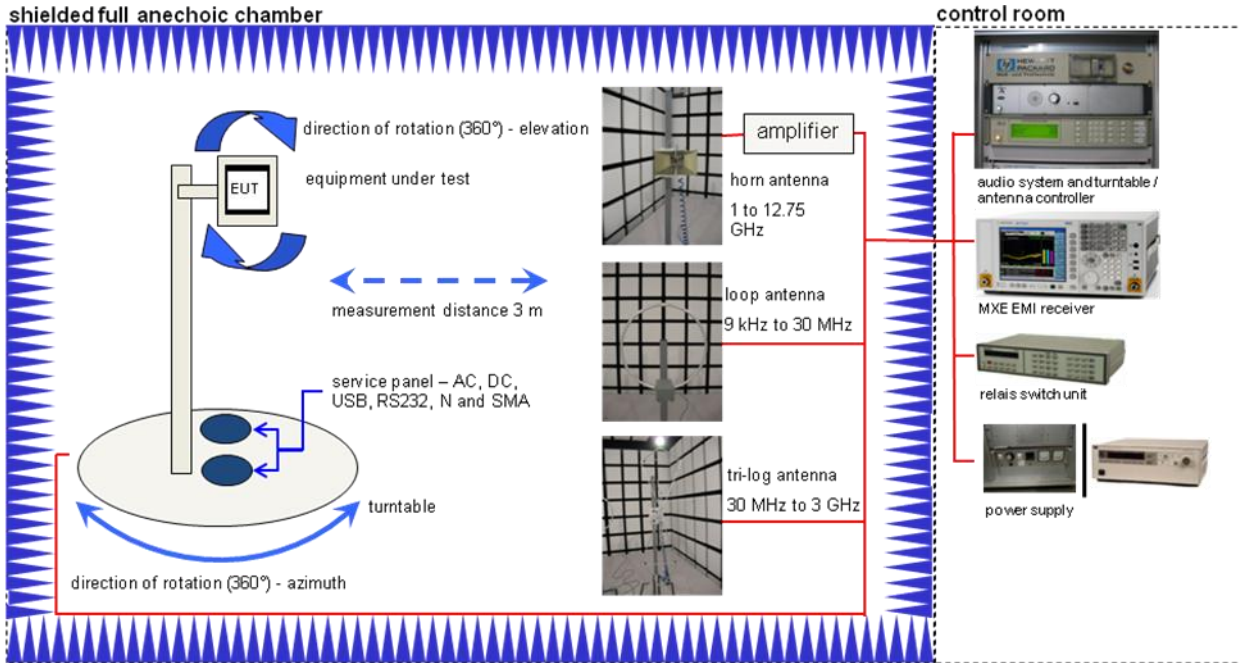
The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are confirmed with specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368
DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580
EMI Test Receiver	ESCI 3	R&S	100083	300003312
Amplifier	JS42-00502650-28-5A	MITEQ	1084532	300003379
Antenna Tower	Model 2175	ETS-LINDGREN	64762	300003745
Positioning Controller	Model 2090	ETS-LINDGREN	64672	300003746
Turntable Interface-Box	Model 105637	ETS-LINDGREN	44583	300003747
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	295	300003787

7.2 Radiated measurements chamber C



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405
TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854
Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351
Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789
Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032
Active Loop Antenna	6502	EMCO	8905-2342	300000256
Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996
Switch / Control Unit	3488A	HP Meßtechnik	*	300000199
Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156
Isolating Transformer	MPL IEC625 Bus Regeltrenntravo	Erfi	91350	300001155
Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997
Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143

7.3 Radiated measurements 12.75 GHz to 25 GHz



Equipment table:

Equipment	Type	Manufacturer	Serial No.	INV. No Cetecom
Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786
Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486
Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268
Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443
Signal Analyzer 40 GHz	FSV40	R&S	101042	300004517

8 Summary of measurement results

- No deviations from the technical specifications were ascertained
- There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	CFR Part 15 RSS 210, Issue 8, Annex 8	Passed	2013-08-29	Reduced testplan! For full tests see 1-3325/11-02-03-A

Test specification clause	Test case	Temperature conditions	Power source voltages	Mode	Pass	Fail	NA	NP	Remark
§15.247(b)(4) RSS 210 / A8.4(2)	Antenna gain	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	reduced testplan
§15.247(e) RSS 210 / A8.2(b)	Power spectral density	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable for FHSS!
§15.247(a)(1) RSS 210 / A8.1(b)	Carrier frequency separation	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	reduced testplan
§15.247(a)(1) RSS 210 / A8.1(d)	Number of hopping channels	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	reduced testplan
§15.247(a)(1) (iii) RSS 210 / A8.3(1)	Time of occupancy (dwell time)	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	reduced testplan
§15.247(a)(1) RSS 210 / A8.2(a)	Spectrum bandwidth of a FHSS system 20dB bandwidth	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	reduced testplan
§15.247(b)(1) RSS-210 / A8.4(2)	Maximum output power	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	Band edge compliance conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	reduced testplan
§15.205 RSS-210 / A8.5	Band edge compliance radiated	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	complies
§15.247(d) RSS-210 / A8.5	TX spurious emissions conducted	Nominal	Nominal	GFSK Pi/4 DQPSK 8 DPSK	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	reduced testplan
§15.247(d) RSS-210 / A8.5	TX spurious emissions radiated	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.109 RSS-Gen	RX spurious emissions radiated	Nominal	Nominal	-/-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.209(a) RSS-Gen	TX spurious emissions radiated < 30 MHz	Nominal	Nominal	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	complies
§15.107(a)	Conducted emissions < 30 MHz	Nominal	Nominal	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	reduced testplan

Note: NA = Not Applicable; NP = Not Performed

9 Additional comments

The Bluetooth® word mark and logos are owned by the Bluetooth SIG Inc. and any use of such marks by Cetecom ICT Services GmbH is under license.

Reference documents: 1-3325/11-02-03-A

Special test descriptions: Reduced Testplan; only radiated measurements.
Hardware change on PC board, but same RF-part and antenna as in referenced testreport.

Configuration descriptions: TX tests: were performed with x-DH5 packets and static PRBS pattern payload.
RX/Standby tests: BT test mode enabled, scan enabled, TX Idle

Test mode:

- Bluetooth Test mode loop back enabled (EUT is controlled over CBT)
- Special software is used.
EUT is transmitting pseudo random data by itself

10 RSP100 test report cover sheet / performance test data

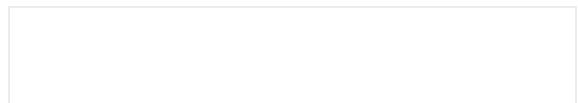
Test report number	:	1-6080/13-01-08-A
Equipment model number	:	FLIR-E64501 (Exx)
Certification number	:	5306A-FLIRE49001
Manufacturer (complete address)	:	FLIR Systems AB Antennvägen 6 18715 Täby / SWEDEN
Tested to radio standards specification no.	:	RSS 210, Issue 8, Annex 8
Open area test site IC No.	:	IC 3462C-1
Frequency range	:	lowest channel 2402 MHz, highest channel 2480 MHz
RF-power [W] (max.)	:	Cond.: 1.1 mW (GFSK modulation) EIRP: 0.8 mW (GFSK modulation) Cond.: 0.7 mW (Pi/4-DQPSK modulation) EIRP: 0.4 mW (Pi/4-DQPSK modulation) Cond.: 0.7 mW (8DPSK modulation) EIRP: 0.5 mW (8DPSK modulation)
Occupied bandwidth (99%-BW) [kHz]	:	745 (GFSK modulation) 1125 (Pi/4-DQPSK modulation) 1168 (8DPSK modulation)
Type of modulation	:	FHSS technology with GFSK, Pi/4 DQPSK and 8 DPSK modulation.
Emission designator (TRC-43)	:	745 KFXD (GFSK modulation) 1M13GXD (Pi/4-DQPSK modulation) 1M17GXD (8DPSK modulation)
Antenna information	:	Integrated antenna
Transmitter spurious (worst case)[dB μ V/m @ 3m]:		47.07 dB μ V/m @ 19.5 GHz

ATTESTATION:

DECLARATION OF COMPLIANCE:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory manager:

2013-08-29	Andreas Luckenbill	
Date	Name	Signature

11 Measurement results

11.1 Antenna gain

Not performed!

11.2 Power spectral density

Not required for hopping systems!

11.3 Carrier frequency separation

Not performed!

11.4 Number of hopping channels

Not performed!

11.5 Time of occupancy (dwell time)

Not performed!

11.6 Spectrum bandwidth of a FHSS system – 20 dB bandwidth

Not performed!

11.7 Maximum output power

Description:

Measurement of the maximum output power radiated. EUT in single channel mode. EUT configuration is made by Marvell Chip configuration tool.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	3 MHz
Resolution bandwidth:	3 MHz
Span:	5 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
Maximum output power	
[Conducted: 0.125 W – antenna gain max. 6 dBi] Systems using more than 75 hopping channels: Conducted: 1.0 W – antenna gain max. 6 dBi	

Results:

Modulation	Maximum output power radiated - EIRP [dBm]		
	2402 MHz	2441 MHz	2480 MHz
Frequency			
GFSK	-1.0	-2.7	-2.3
Pi/4 DQPSK	-4.0	-5.9	-5.6
8DPSK	-3.0	-4.8	-3.7
Measurement uncertainty	± 3 dB		

Result: Passed

11.8 Band edge compliance conducted

Not performed!

11.9 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit channel is channel 00 for the lower restricted band and channel 78 for the upper restricted band. The measurement is repeated for all modulations. Measurement distance is 3m.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	1 MHz Peak / 10 Hz AVG
Resolution bandwidth:	1 MHz
Span:	Lower Band: 2370 – 2400 MHz Upper Band: 2480 – 2500 MHz
Trace-Mode:	Max Hold

Limits:

FCC	IC
Band edge compliance radiated	
<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).</p>	
54 dB μ V/m AVG 74 dB μ V/m Peak	

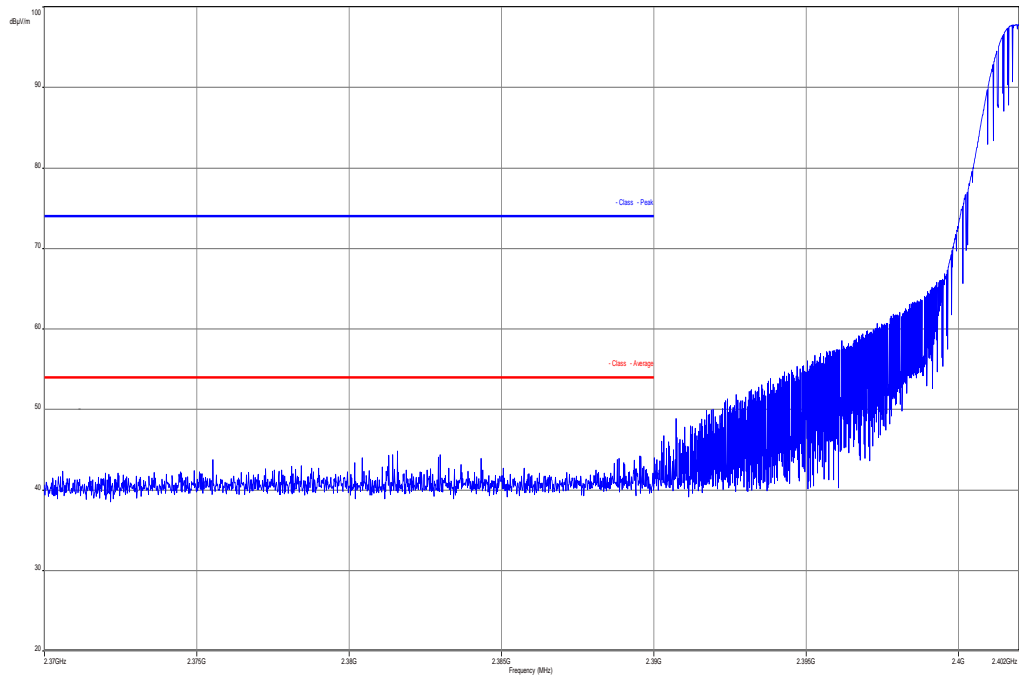
Results:

Scenario Modulation	Band edge compliance radiated [dB μ V/m]		
	GFSK	Pi/4 DQPSK	8DPSK
Lower restricted band	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP
Upper restricted band	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP	< 54 AVG / < 74 PP
Measurement uncertainty	± 3 dB		

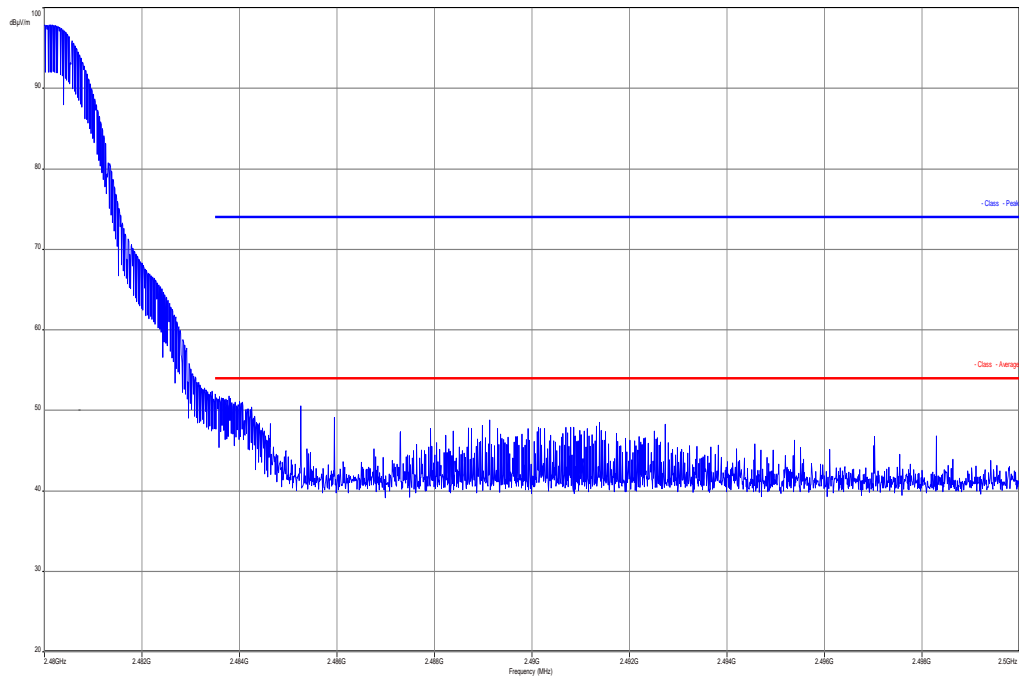
Result: Passed

Plots:

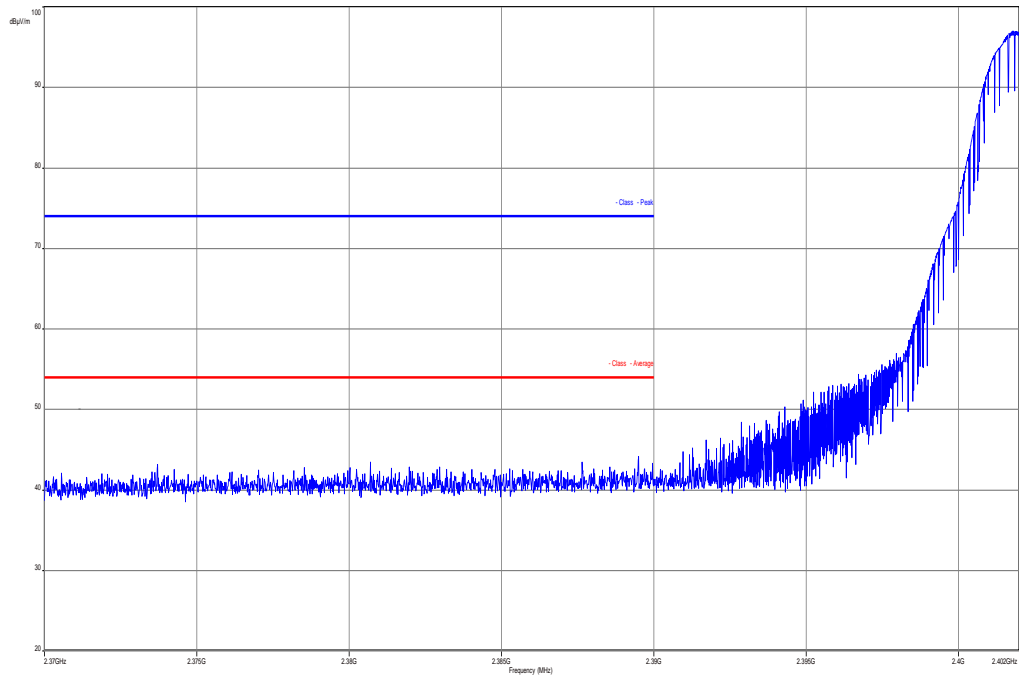
Plot 1: Lower band edge, GFSK modulation, vertical & horizontal polarization



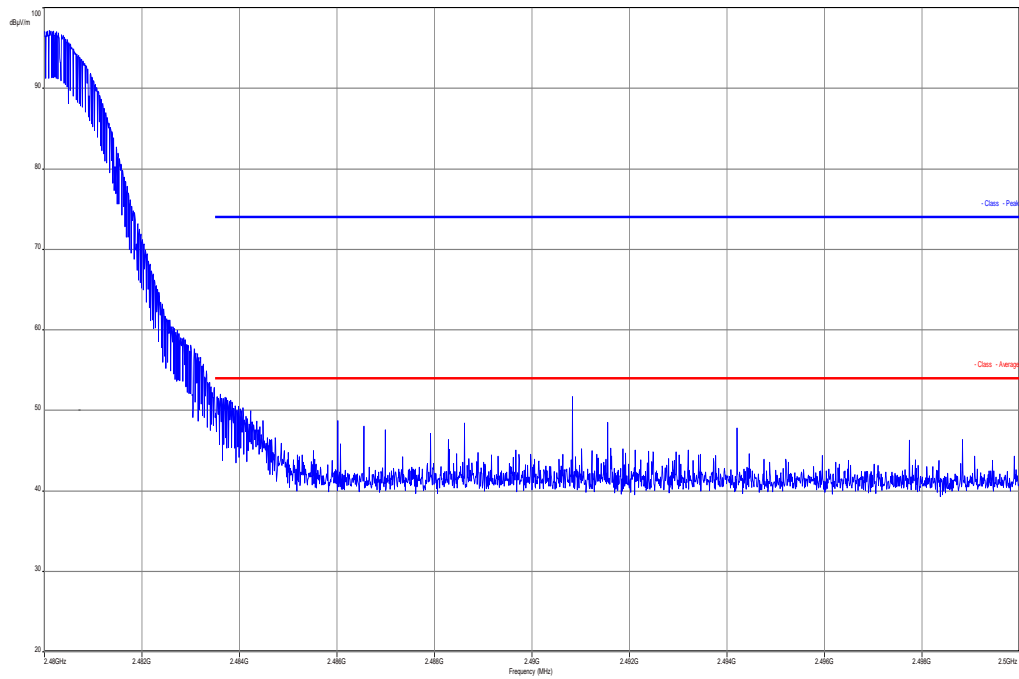
Plot 2: Upper band edge, GFSK modulation, vertical & horizontal polarization



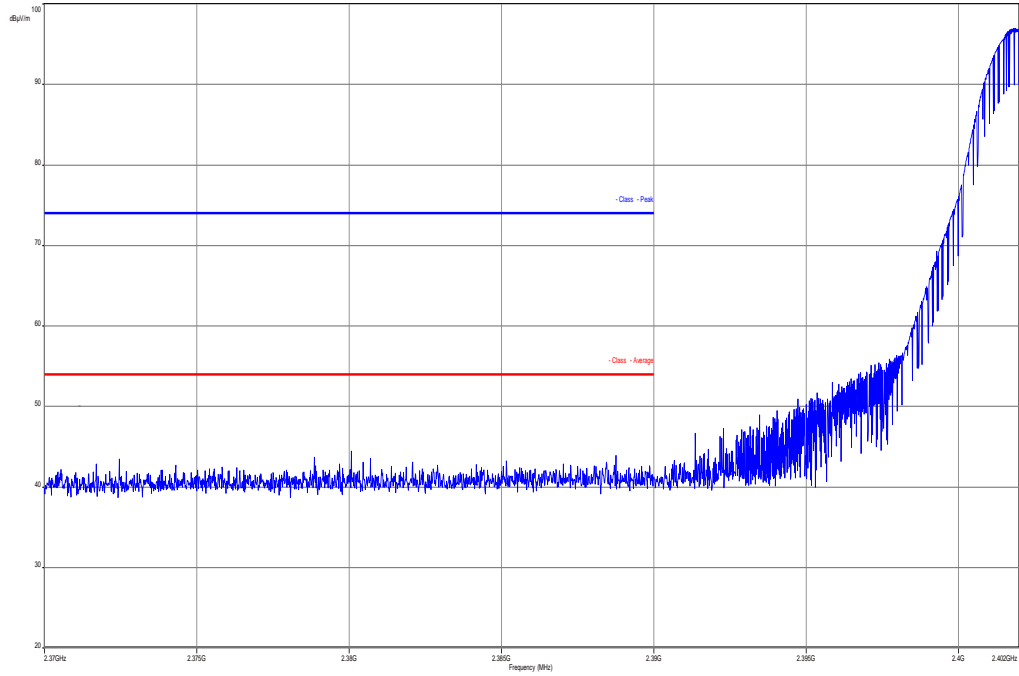
Plot 3: Lower band edge, Pi/4 DQPSK modulation, vertical & horizontal polarization



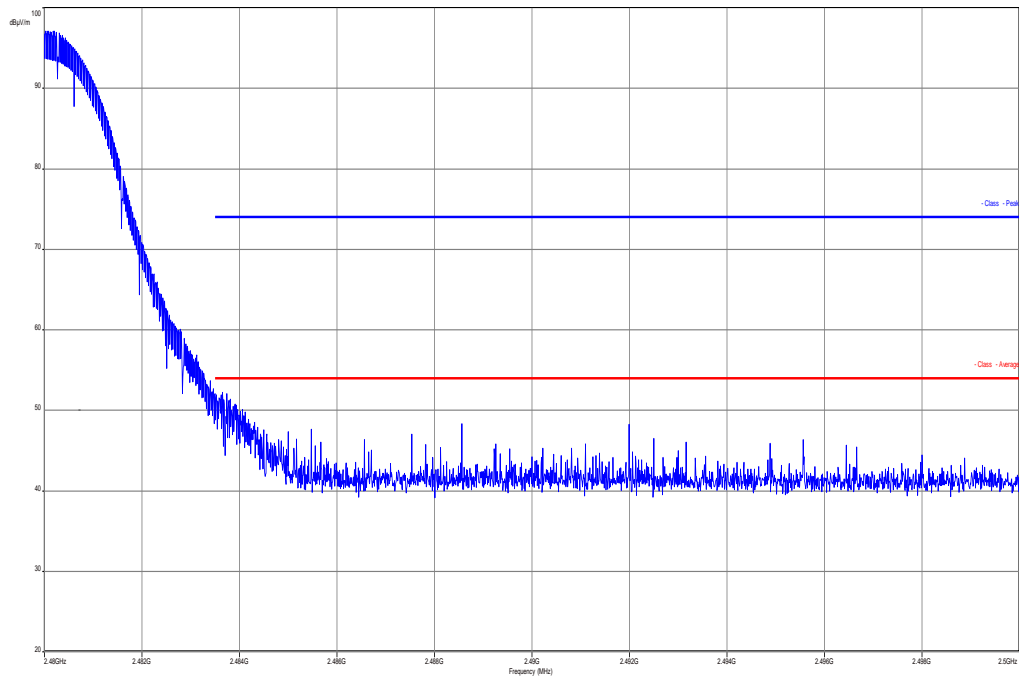
Plot 4: Upper band edge, Pi/4 DQPSK modulation, vertical & horizontal polarization



Plot 5: Lower band edge, 8 DPSK modulation, vertical & horizontal polarization



Plot 6: Upper band edge, 8 DPSK modulation, vertical & horizontal polarization



11.10 TX spurious emissions conducted

Not performed!

11.11 TX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit channel is channel 00, channel 39 and channel 78. The measurement is performed in the mode with the highest output power.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi Peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold
Measured Modulation:	<input checked="" type="checkbox"/> GFSK <input type="checkbox"/> Pi/4 DQPSK <input type="checkbox"/> 8DPSK

The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

FCC		IC	
TX spurious emissions radiated			
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).			
§15.209			
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance	
30 - 88	30.0	10	
88 – 216	33.5	10	
216 – 960	36.0	10	
Above 960	54.0	3	

Results:

TX spurious emissions radiated [dBµV/m]								
2402 MHz			2441 MHz			2480 MHz		
F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]	F [MHz]	Detector	Level [dBµV/m]
For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.			For emissions below 1 GHz, please take a look at the table below the 1 GHz plot.		
Measurement uncertainty			± 3 dB					

Result: Passed

Plots:

Plot 1: 30 MHz to 1 GHz, TX mode, channel 00, vertical & horizontal polarization

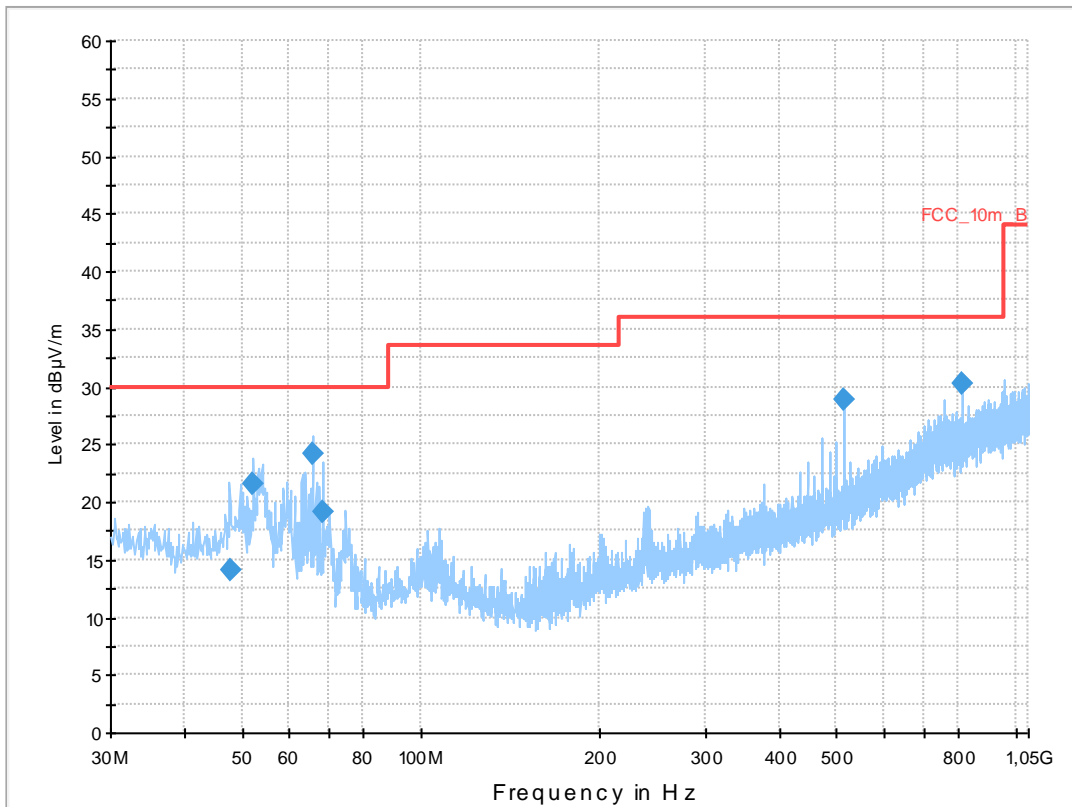
Common Information

EUT: FLIR-E64501 (Exx)
 Serial Number:
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: BT TX Ch. 00 (DH5)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESC1 3]
 Level Unit: dBµV/m

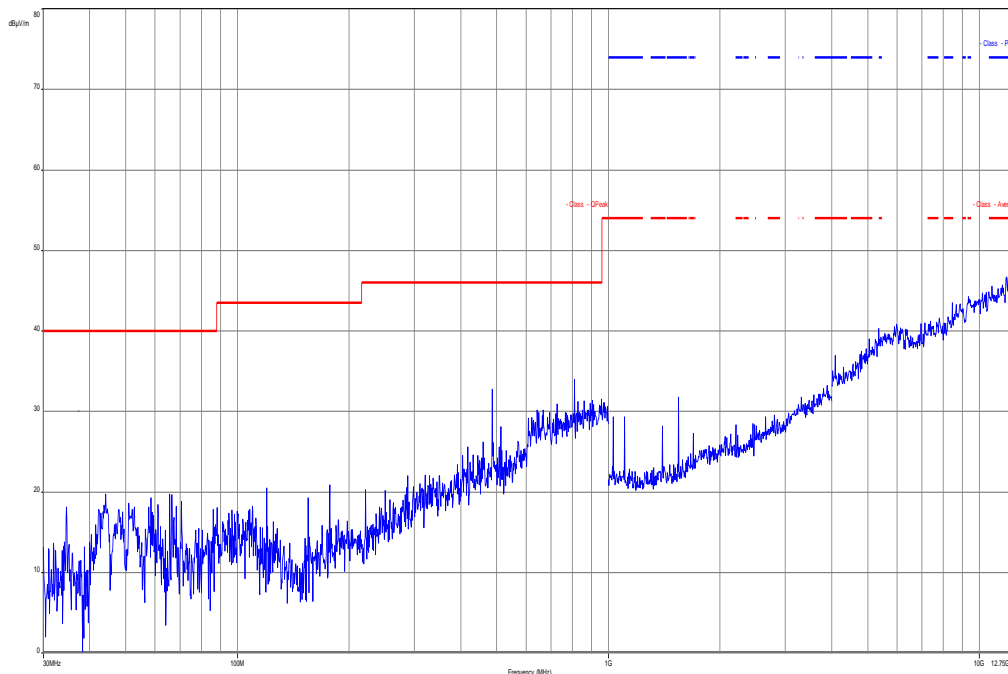
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

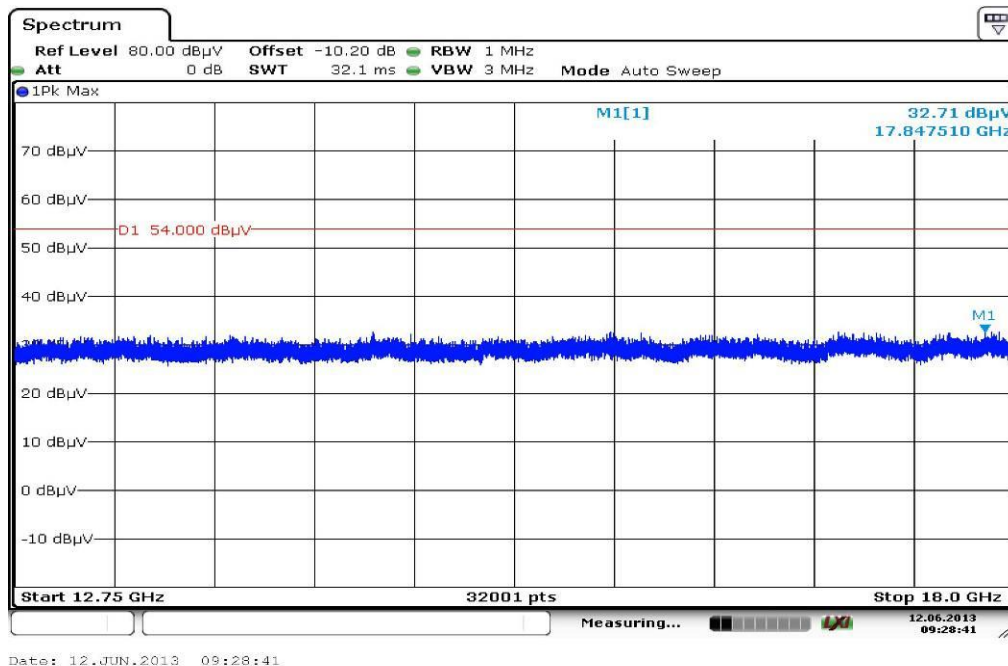
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
47.767950	14.0	1000.0	120.000	170.0	V	190.0	13.3	16.0	30.0	
52.190100	21.6	1000.0	120.000	98.0	V	190.0	13.2	8.4	30.0	
65.705850	24.1	1000.0	120.000	170.0	V	100.0	10.2	5.9	30.0	
68.391900	19.1	1000.0	120.000	170.0	V	280.0	9.6	10.9	30.0	
513.019200	29.0	1000.0	120.000	170.0	H	190.0	18.9	7.0	36.0	
810.118200	30.3	1000.0	120.000	98.0	H	100.0	24.0	5.7	36.0	

Plot 2: 1 GHz to 12.75 GHz, TX mode, channel 00, vertical & horizontal polarization

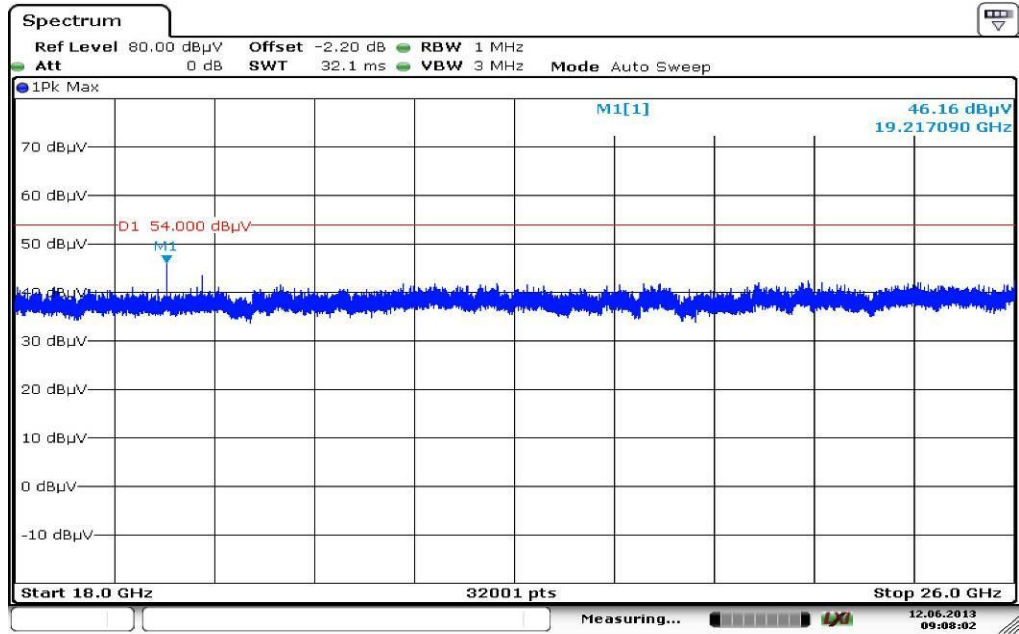


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 3: 12.75 GHz to 18 GHz, TX mode, channel 00, vertical & horizontal polarization



Plot 4: 18 GHz to 26 GHz, TX mode, channel 00, vertical & horizontal polarization



Plot 5: 30 MHz to 1 GHz, TX mode, channel 39, vertical & horizontal polarization

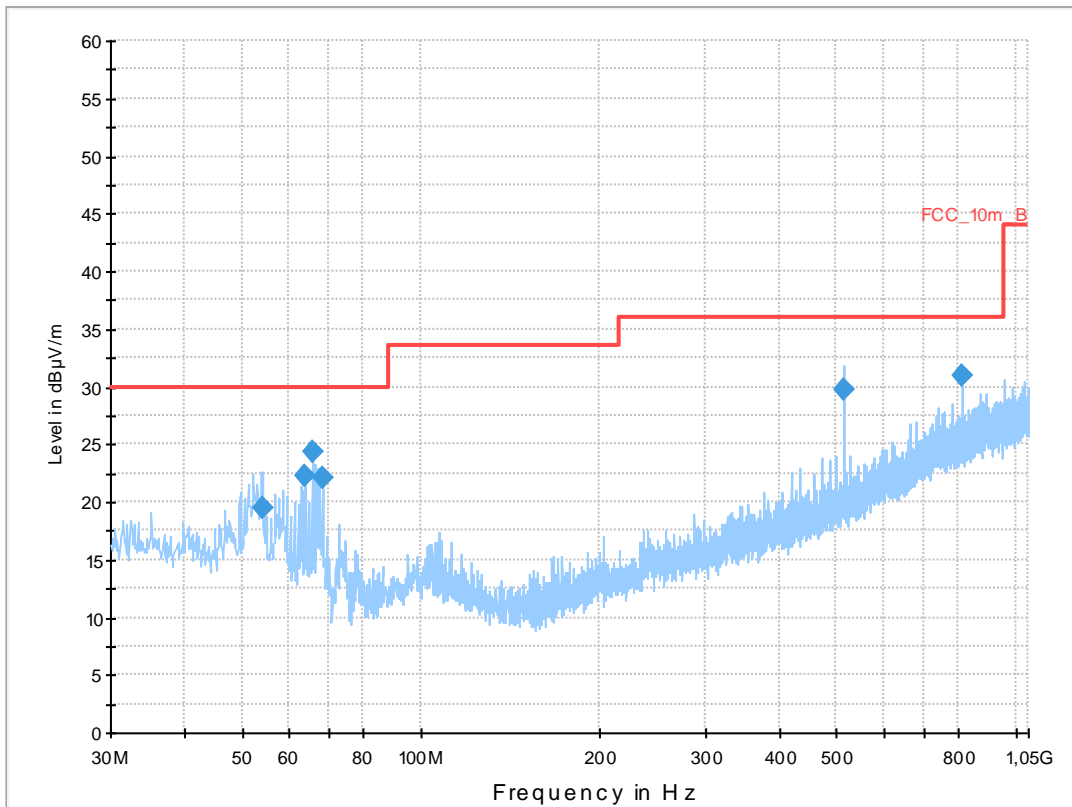
Common Information

EUT: FLIR-E64501 (Exx)
 Serial Number:
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: BT TX Ch. 39 (DH5)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

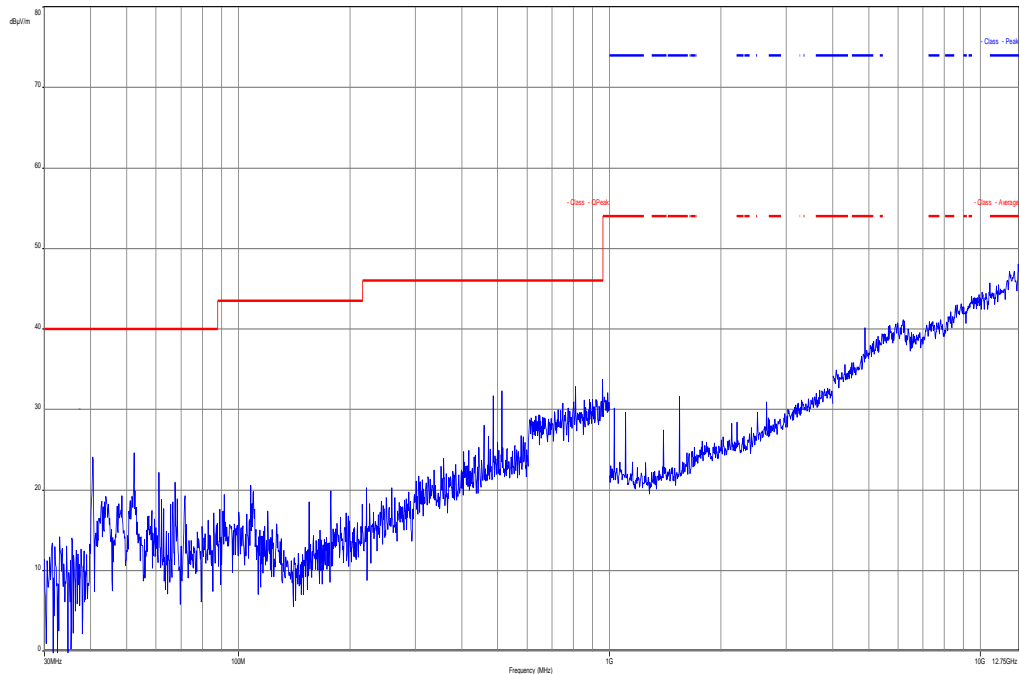
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

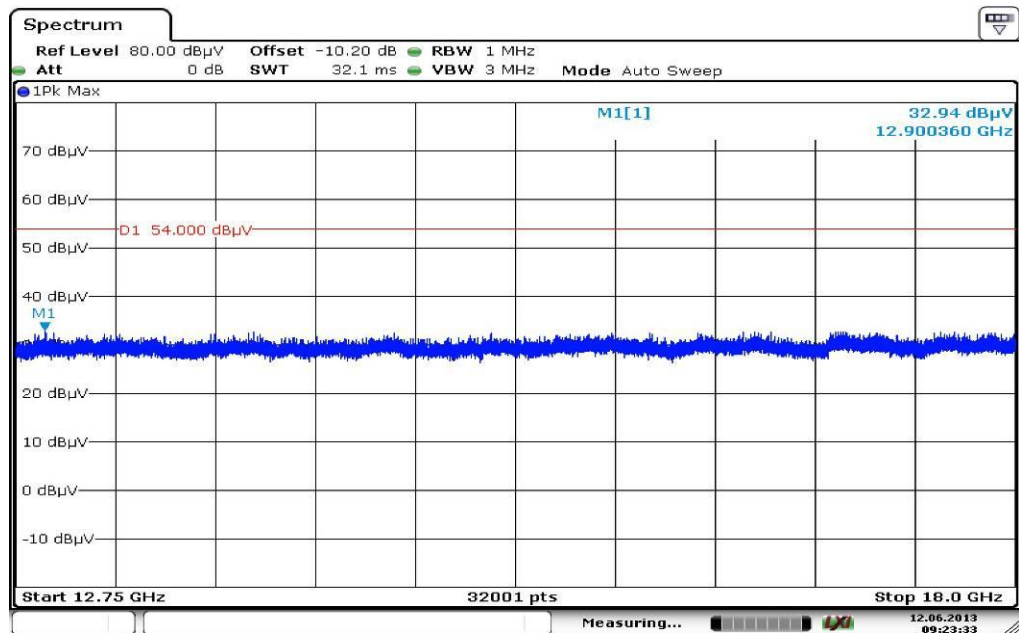
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
53.955750	19.4	1000.0	120.000	170.0	V	190.0	13.0	10.6	30.0	
63.870450	22.2	1000.0	120.000	170.0	V	0.0	10.7	7.8	30.0	
65.655600	24.4	1000.0	120.000	170.0	V	190.0	10.3	5.6	30.0	
68.378400	22.1	1000.0	120.000	170.0	V	81.0	9.6	7.9	30.0	
513.006750	29.8	1000.0	120.000	170.0	H	190.0	18.9	6.2	36.0	
810.102900	30.9	1000.0	120.000	111.0	H	100.0	24.0	5.1	36.0	

Plot 6: 1 GHz to 12.75 GHz, TX mode, channel 39, vertical & horizontal polarization



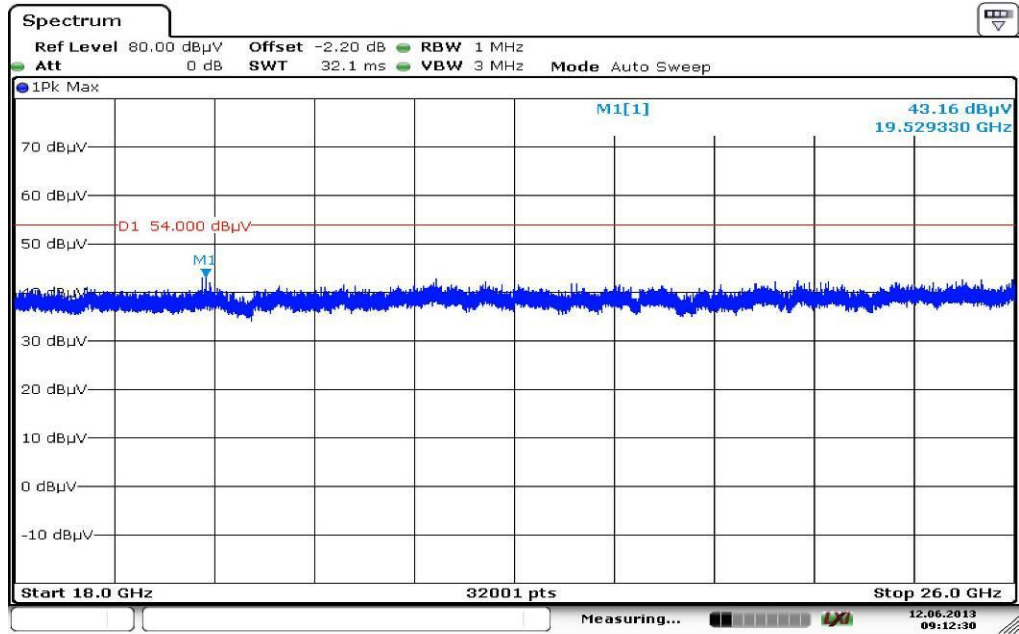
The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 7: 12.75 GHz to 18 GHz, TX mode, channel 39, vertical & horizontal polarization



Date: 12.JUN.2013 09:23:33

Plot 8: 18 GHz to 26 GHz, TX mode, channel 39, vertical & horizontal polarization



Date: 12.JUN.2013 09:12:30

Plot 9: 30 MHz to 1 GHz, TX mode, channel 78, vertical & horizontal polarization

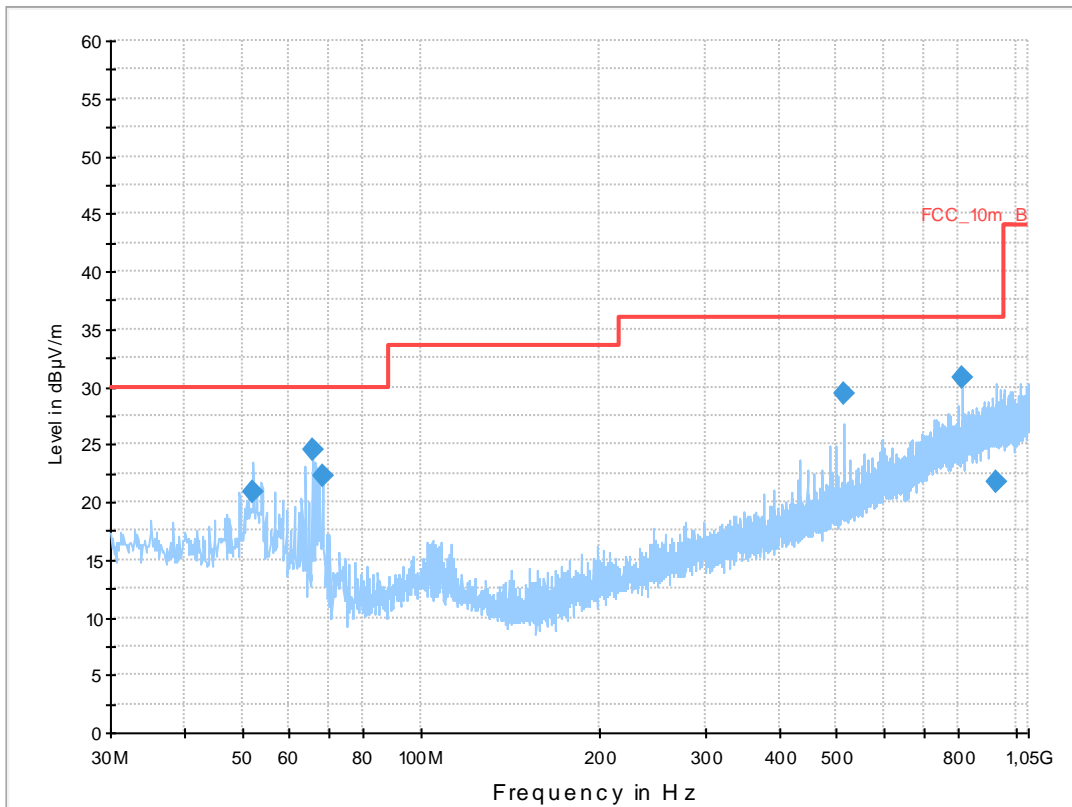
Common Information

EUT: FLIR-E64501 (Exx)
 Serial Number:
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: BT TX Ch. 78 (DH5)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

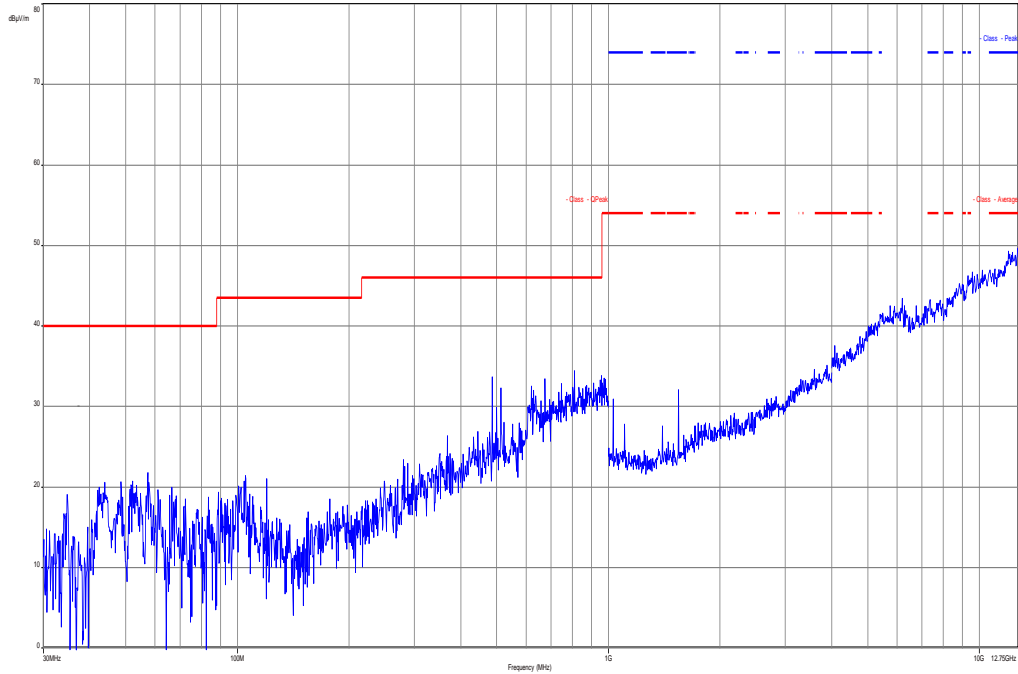
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



Final Result 1

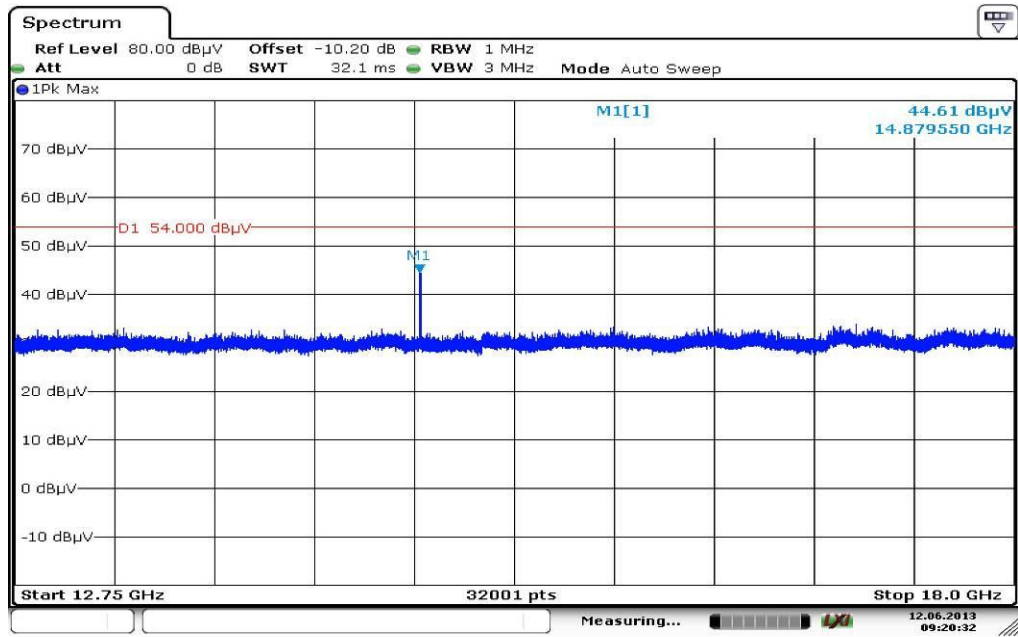
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
52.156800	20.8	1000.0	120.000	98.0	V	81.0	13.2	9.2	30.0	
65.641500	24.5	1000.0	120.000	170.0	V	-9.0	10.3	5.5	30.0	
68.354700	22.3	1000.0	120.000	170.0	V	-5.0	9.6	7.7	30.0	
513.017700	29.4	1000.0	120.000	170.0	H	190.0	18.9	6.6	36.0	
810.094050	30.8	1000.0	120.000	98.0	H	100.0	24.0	5.2	36.0	
926.578350	21.8	1000.0	120.000	170.0	H	179.0	25.3	14.2	36.0	

Plot 10: 1 GHz to 12.75 GHz, TX mode, channel 78, vertical & horizontal polarization

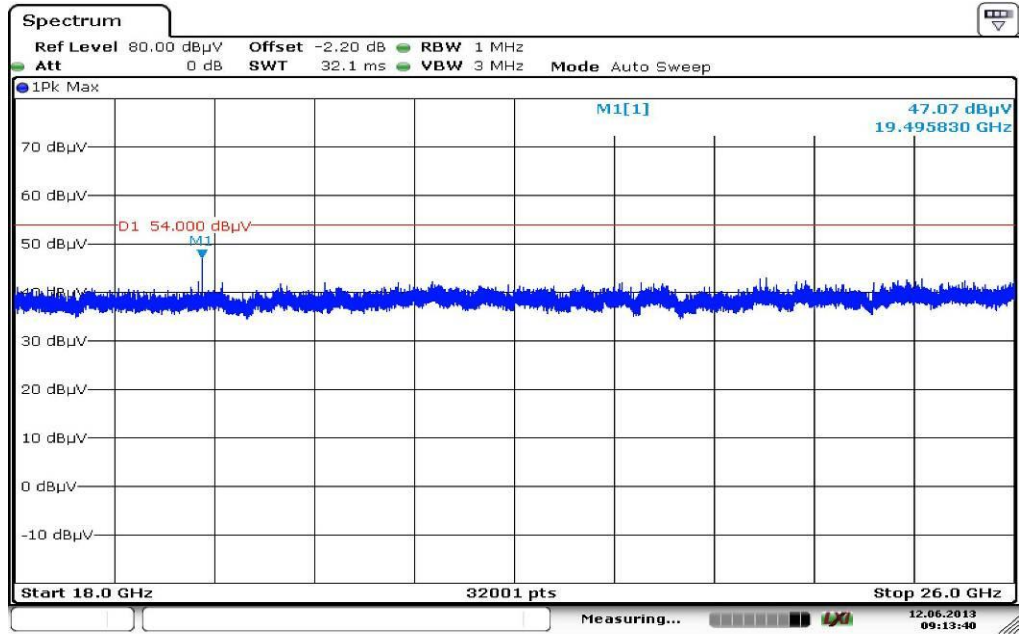


The carrier signal is notched with a 2.4 GHz band rejection filter.

Plot 11: 12.75 GHz to 18 GHz, TX mode, channel 78, vertical & horizontal polarization



Plot 12: 18 GHz to 26 GHz, TX mode, channel 78, vertical & horizontal polarization



Date: 12.JUN.2013 09:13:40

11.12 RX spurious emissions radiated

Description:

Measurement of the radiated spurious emissions in idle/receive mode. The EUT is detached so all oscillators are active.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Video bandwidth:	Sweep: 100 kHz Remeasurement: 10 Hz
Resolution bandwidth:	F < 1 GHz: 100 kHz F > 1 GHz: 1 MHz
Span:	30 MHz to 25 GHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
RX Spurious Emissions Radiated		
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
Above 960	54.0	3

Results:

RX spurious emissions radiated [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
No peaks detected		
Measurement uncertainty	±3 dB	

Result: Passed

Plots:

Plot 1: 30 MHz to 1 GHz, RX mode, vertical & horizontal polarization

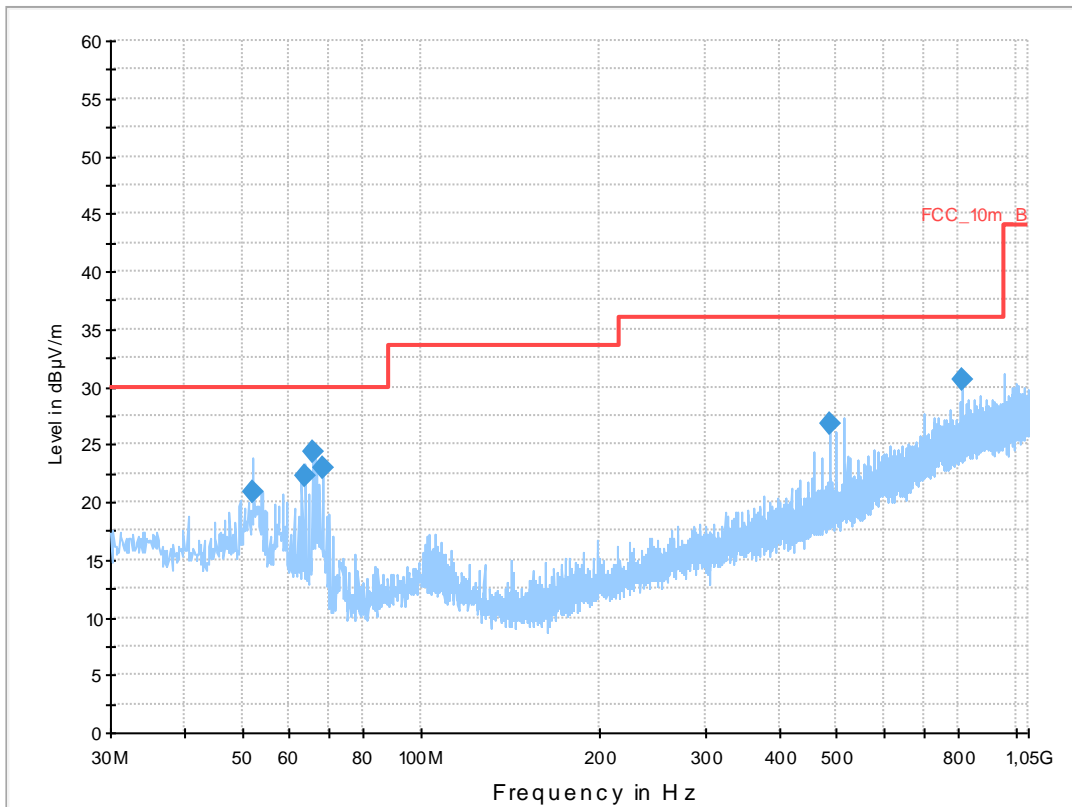
Common Information

EUT: FLIR-E64501 (Exx)
 Serial Number:
 Test Description: FCC part 15 C class B @ 10 m
 Operating Conditions: BT RX (DH5)
 Operator Name: Hennemann
 Comment: AC: 115 V / 60 Hz;

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup: Electric Field (NOS)
 Receiver: [ESCI 3]
 Level Unit: dBµV/m

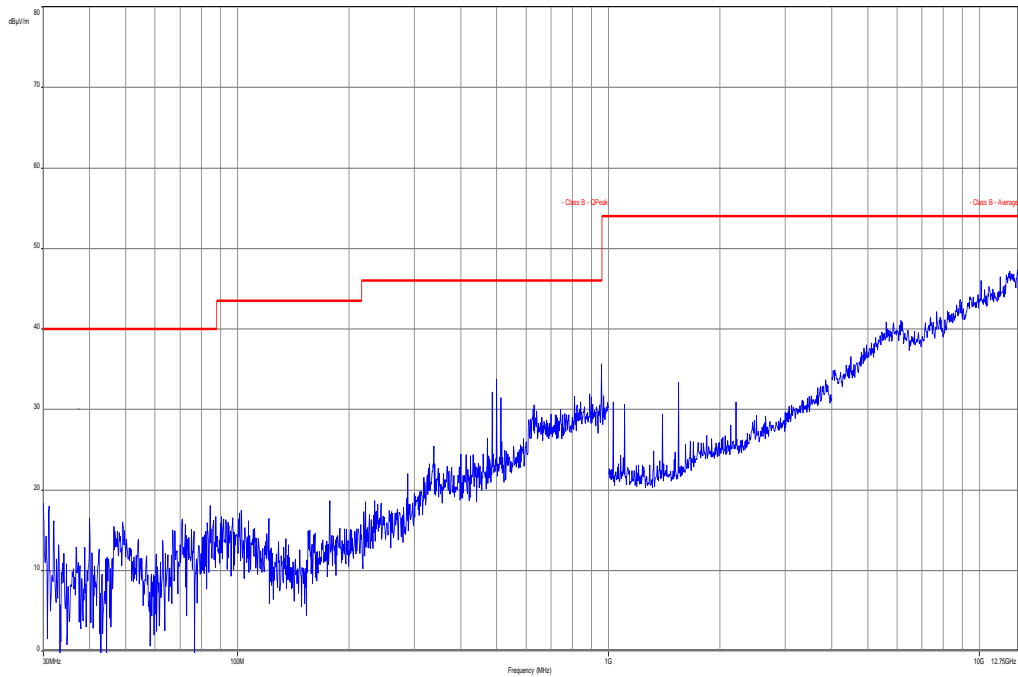
Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 2 GHz	60 kHz	QPK	120 kHz	1 s	20 dB



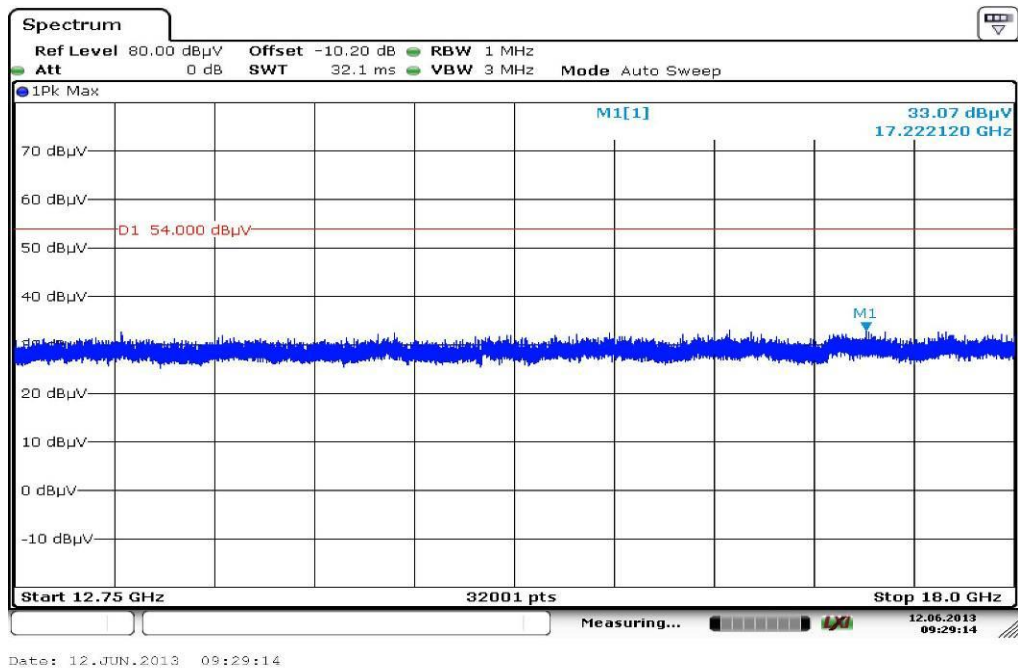
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
52.163850	20.9	1000.0	120.000	98.0	V	10.0	13.2	9.1	30.0	
63.845850	22.2	1000.0	120.000	170.0	V	100.0	10.7	7.8	30.0	
65.665800	24.4	1000.0	120.000	170.0	V	90.0	10.3	5.6	30.0	
68.348850	23.0	1000.0	120.000	170.0	V	90.0	9.7	7.0	30.0	
486.016950	26.9	1000.0	120.000	170.0	H	10.0	18.4	9.1	36.0	
810.097650	30.6	1000.0	120.000	130.0	H	100.0	24.0	5.4	36.0	

Plot 2: 1 GHz to 12.75 GHz, RX mode, vertical & horizontal polarization

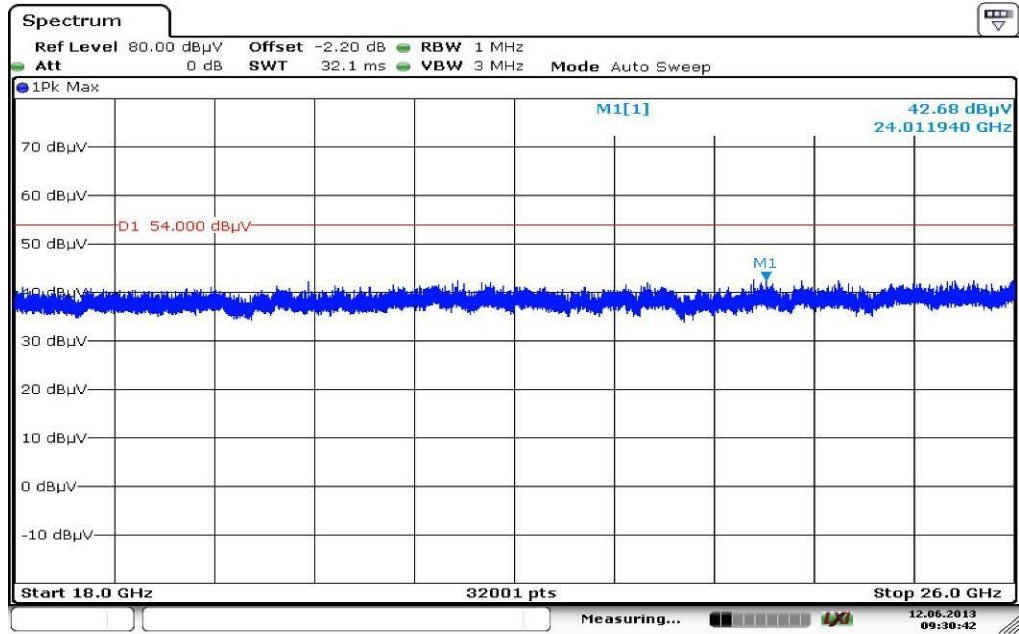


Plot 3: 12.75 GHz to 18 GHz, RX mode, vertical & horizontal polarization



Date: 12.JUN.2013 09:29:14

Plot 4: 18 GHz to 26 GHz, RX mode, vertical & horizontal polarization



Date: 12 JUN 2013 09:30:42

11.13 Spurious emissions radiated < 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit channel is channel 39. This measurement is representative for all channels and modes. If critical peaks are found channel 00 and channel 78 will be measured too. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m with 40 dB/decade according CFR Part 2.

Measurement:

Measurement parameter	
Detector:	Peak / Quasi peak
Sweep time:	Auto
Video bandwidth:	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Resolution bandwidth:	F < 150 kHz: 1 kHz F > 150 kHz: 100 kHz
Span:	9 kHz to 30 MHz
Trace-Mode:	Max Hold

Limits:

FCC		IC
TX spurious emissions radiated < 30 MHz		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

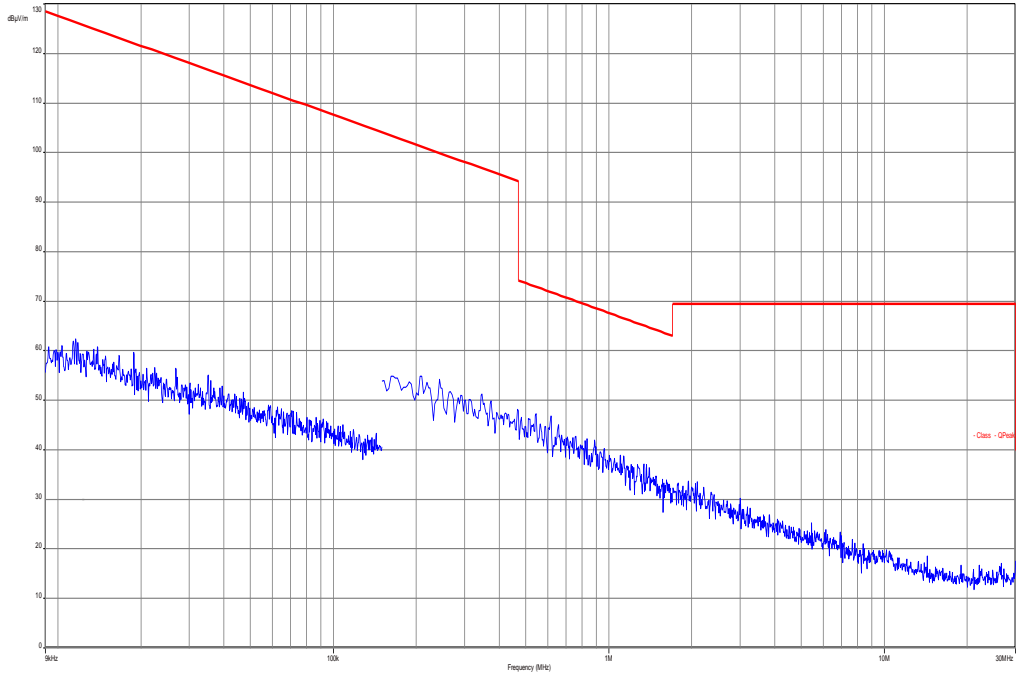
Results:

TX spurious emissions radiated < 30 MHz [dBµV/m]		
F [MHz]	Detector	Level [dBµV/m]
No peaks detected		
Measurement uncertainty	± 3 dB	

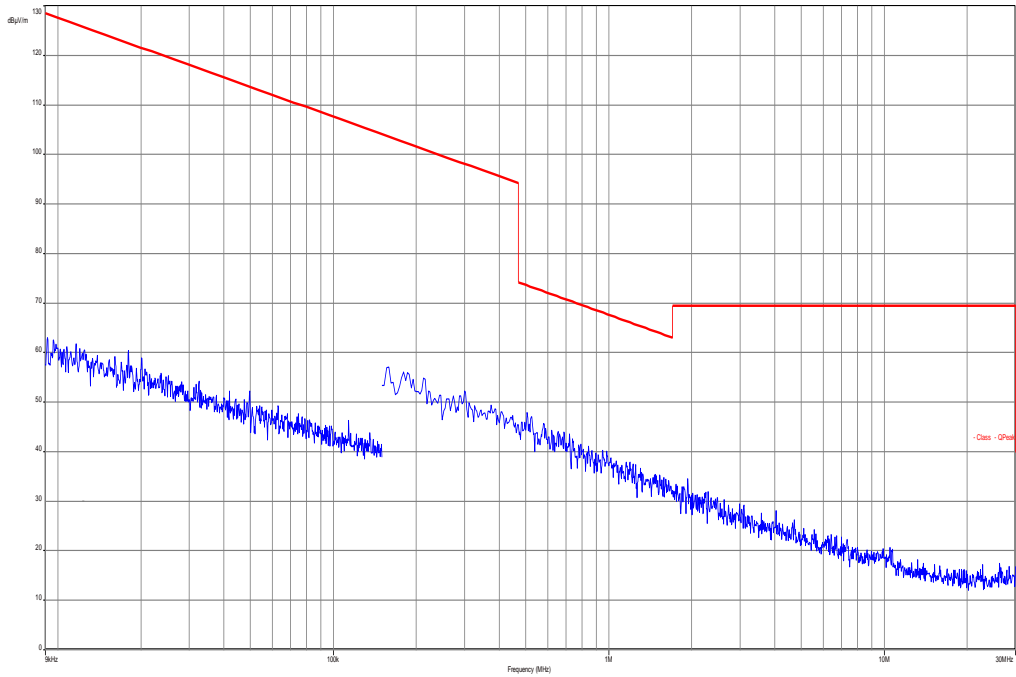
Result: Passed

Plots:

Plot 1: 9 kHz to 30 MHz, TX mode



Plot 2: 9 kHz to 30 MHz, RX mode



11.14 Spurious emissions conducted < 30 MHz

Not performed!

12 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	45	Switch-Unit	3488A	HP Meßtechnik	2719A14505	300000368	g		
2	50	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04466	300000580	ne		
3	n. a.	software	SPS_PHE 1.4f	Spitzberger & Spieß	B5981; 5D1081;B597 9	300000210	ne		
4	n. a.	EMI Test Receiver	ESCI 3	R&S	100083	300003312	k	09.01.2013	09.01.2014
5	n. a.	Analyser- Reference- System (Harmonics and Flicker)	ARS 16/1	SPS	A3509 07/0 0205	300003314	k	14.07.2011	14.07.2013
6	n. a.	Amplifier	JS42- 00502650- 28-5A	MITEQ	1084532	300003379	ev		
7	n. a.	Antenna Tower	Model 2175	ETS- LINDGREN	64762	300003745	izw		
8	n. a.	Positioning Controller	Model 2090	ETS- LINDGREN	64672	300003746	izw		
9	n. a.	Turntable Interface-Box	Model 105637	ETS- LINDGREN	44583	300003747	izw		
10	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	295	300003787	k	12.04.2012	12.04.2014
11	n. a.	Spectrum- Analyzer	FSU26	R&S	200809	300003874	k	16.01.2013	16.01.2014
12	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	08.05.2013	08.05.2015
13	n. a.	Active Loop Antenna 10 kHz to 30 MHz	6502	EMCO	8905-2342	300000256	vIKI!	13.06.2013	13.06.2015
14	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
15	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	*	300000199	ne		
16	n. a.	Switch / Control Unit	3488A	HP Meßtechnik	2719A15013	300001156	ne		
17	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
18	n. a.	Amplifier	js42- 00502650- 28-5a	Parzich GMBH	928979	300003143	ne		
19	n. a.	Band Reject filter	WRCG240 0/2483- 2375/2505- 50/10SS	Wainwright	11	300003351	ev		
20	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbe ck	371	300003854	vIKI!	14.10.2011	14.10.2014
21	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologi es	MY51210197	300004405	k	21.02.2013	21.02.2014
22	n. a.	Signal Analyzer	FSV40	R&S	101042	300004517	k	22.10.2012	22.10.2013

		40 GHz							
23	11b	Microwave System Amplifier, 0.5-26.5 GHz	83017A	HP Meßtechnik	00419	300002268	ev		
24	A025	Std. Gain Horn Antenna 12.4 to 18.0 GHz	639	Narda		300000786	ne		
25	A027	Std. Gain Horn Antenna 18.0 to 26.5 GHz	638	Narda		300000486	ne		

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vk!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

13 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A Document history

Version	Applied changes	Date of release
1.0	Initial release	2013-06-19
-A	Editorial changes	2013-08-29

Annex B Further information**Glossary**

AVG	-	Average
DUT	-	Device under test
EMC	-	Electromagnetic Compatibility
EN	-	European Standard
EUT	-	Equipment under test
ETSI	-	European Telecommunications Standard Institute
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	Not applicable
PP	-	Positive peak
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software

Annex C Accreditation Certificate

Front side of certificate



Deutsche Akkreditierungsstelle GmbH

Befehlens gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
 Unterzeichnerin der Multilateralen Abkommen
 von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

CETECOM ICT Services GmbH
 Untertürkheimer Straße 6-10, 66117 Saarbrücken

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

- Drahtgebundene Kommunikation einschließlich xDSL
- VoIP und DECT
- Akustik
- Funk einschließlich WLAN
- Short Range Devices (SRD)
- RFID
- WiMax und Richtfunk
- Mobilfunk (GSM / DCS, Over the Air (OTA) Performance)
- Elektromagnetische Verträglichkeit (EMV) einschließlich Automotive
- Produktsicherheit
- SAR und Hearing Aid Compatibility (HAC)
- Umweltsimulation
- Smart Card Terminals
- Bluetooth
- Wi-Fi- Services

Die Akkreditierungskurde gilt nur in Verbindung mit dem Bescheid vom 18.01.2013 mit der Akkreditierungsnummer D-PI-12076-01 und ist gültig 17.01.2018. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 80 Seiten.

Registrierungsnummer der Urkunde: D-PI-12076-01-01

Frankfurt am Main, 18.01.2013
 Seite 11/100 auf der Rückseite

Im Auftrag
 Dr. Ingrid Pflüger
 Abteilungsleiter

Back side of certificate

Deutsche Akkreditierungsstelle GmbH

Standort Berlin Spittelmarkt 10 10117 Berlin	Standort Frankfurt am Main Gartenstraße 6 60594 Frankfurt am Main	Standort Braunschweig Rundesallee 100 38116 Braunschweig
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Die auszugsweise Veröffentlichung der Akkreditierungskurde bedarf der vorherigen schriftlichen Zustimmung der Deutsche Akkreditierungsstelle GmbH (DAkkS). Ausgenommen davon ist die separate Weiterverbreitung des Deckblattes durch die umseitig genannte Konformitätsbewertungsstelle in unveränderter Form.

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Die Akkreditierung erfolgte gemäß des Gesetzes über die Akkreditierungsstelle (AkkStelleG) vom 31. Juli 2009 (BGBl. I S. 2625) sowie der Verordnung (EG) Nr. 765/2008 des Europäischen Parlaments und des Rates vom 9. Juli 2008 über die Vorschriften für die Akkreditierung und Marktüberwachung im Zusammenhang mit der Vermarktung von Produkten (AbL L 218 vom 9. Juli 2008, S. 30). Die DAkkS ist Unterzeichnerin der Multilateralen Abkommen zur gegenseitigen Anerkennung der European co-operation for Accreditation (EA), des International Accreditation Forum (IAF) und der International Laboratory Accreditation Cooperation (ILAC). Die Unterzeichner dieser Abkommen erkennen ihre Akkreditierungen gegenseitig an.

Der aktuelle Stand der Mitgliedschaft kann folgenden Webseiten entnommen werden:
 EA: www.european-accreditation.org
 ILAC: www.ilac.org
 IAF: www.iaf.nu

Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

<http://www.cetecom.com/eu/de/cetecom-group/europa/deutschland-saarbruecken/akkreditierungen.html>